We Claim:

1. A method for encoding signals to be transmitted from a plurality of transmitting antennas comprising the steps of:

mapping a block of bits, having a duration T, into a first vector;

processing said vector with a set of mutually orthogonal vectors and a delayed symbols vector to develop a current symbols vector;

delaying said current symbols vector by said duration T;

mapping said current symbols vector with a space time coder to develop a plurality of signals; and

applying said plurality of signals to said plurality of antennas.

2. The method of claim **1** where said plurality of transmitting antenna comprises more than one antenna.

3. The method of claim **1** where said plurality of transmitting antennas comprises more than two antennas.

4. The method of claim **1** where said duration T has p time slots, said mapping develops p sets of n signals, and said step of applying applies a different one of said sets on n signals during each of said p time slots.

5. The method of claim **4** where said step of processing computes,

$S_{u+1} = \sum_{l=1}^{k} P_{wl}\, v_l(S_u)$, where P_w is said first vector, P_{wl} is the l^{th} element of P_w, and the sequences $v_1(S_u)$, $v_2(S_u)$, $\ldots v_k(S_u)$ belong to said set of mutually orthogonal vectors.

6. The method of claim **5** where k=4, and said mutually orthogonal vectors are $v_1(S) = (s_1\ s_2\ s_3\ s_4)^T$, $v_2(S) = (s_2 - s_1\ s_4 - s_3)^T$, $v_3(S) = (s_3 - s_4 - s_1\ s_2)^T$ and $v_4(S) = (s_4 s_3 - s_2 - s_1)^T$, S being a vector that is applied to said mutually orthogonal vectors.

7. The method of claim **5** where k=3, and said mutually orthogonal vectors are any three of $v_1(S) = (s_1\ s_2\ s_3\ s_4)^T$, $v_2(S) = (s_2 - s_1\ s_4 - s_3)^T$, $v_3(S) = (s_3 - s_4 - s_1\ s_2)^T$ and $v_4(S) = (s_4 s_3 - s_2 - s_1)^T$, S being a vector that is applied to said mutually orthogonal vectors.

8. The method of claim **1** where said space time coder employs a complex constellation set and develops a transmission rate of one half.

9. The method of claim **1** where said space time coder employs a real constellation set and develop a transmission rate of one.

10. A method for receiving signals that were transmitted in accordance with claim **1**, comprising the steps of:

receiving signals in blocks;

processing signals to develop a first vector, R_u, for each block u;

developing a vector $\mathcal{R}$ having n elements $R_{u+1}R_u^{q}*$, where R_u^q corresponds to R_u processed with sequence $v_q(R_u)$, which is a q^{th} member of a set of receiver sequences that are mutually orthogonal, for all values of q=1, 2, …, n, where n is a preselected number;

performing minimum distance detection on said vector $\mathcal{R}$ to develop therefrom a vector P; and

applying a mapping to said vector P to obtain a block of bits.

11. The method of claim **10** where n equals number of antennas in said plurality of transmitting antennas.

12. The method of claim **10** where said mutually orthogonal receiver sequences are the same as the orthogonal vectors employed in said method of claim **1**.

13. A method for receiving signals that were transmitted in accordance with claim **1**, comprising the steps of:

receiving signals in blocks in each of an m plurality of receiving antenna;

processing signals of each receiving antenna to develop a first vector, R_u, associated with said each receiving antenna, for each block u;

developing a vector $\mathcal{R}^j$ for each receiving antenna, j, said vector having n elements $R_{u+1}R_u^q{}^*$, where R_u^q corresponds to said first vector R_u processed with sequence $v_q(R_u)$, which is a q^{th} member of a set of receiver sequences that are mutually orthogonal, for all values of q=1, 2, …, n, where n is a preselected number, thus developing m $\mathcal{R}^j$ vectors;

summing said m $\mathcal{R}^j$ vectors to obtain a summed vector $\mathcal{R}$;

performing minimum distance detection on said vector $\mathcal{R}$ to develop therefrom a vector P; and

applying a mapping to said vector P to obtain a block of bits.

The method of claim **10** where said $m > 1$ where said step of receiving is receiving blocks of signals in each of a plurality of receiving antennas, and said step of developing a vector

14. A method for receiving signals that were transmitted in accordance with claim **1** by a transmitter having more than two transmitting antennas, comprising the steps of:

receiving, through m receiving antennas, where m=1 or more, signals in blocks;

detecting signals transmitted in each block by processing received signals of said each block with aid of processed signals of immediately previous block.

15. The method of claim **14** where said step of detecting excludes consideration of parameters between said transmitting antennas and said receiving antennas.